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When $m=l, n=a, F=2\pi a\rho k \left\{ \frac{1}{\sqrt{l^2+a^2}} - \frac{1}{a} \right\}$.

When $m=0, n=a, F=-2\pi a\rho k \left\{ \frac{1}{\sqrt{l^2+a^2}} - \frac{1}{a} \right\}$.

When $n=2a$ the particle is on the surface of the cylinder,

$$\text{then } b^2 = \frac{4a^2}{m^2 + 4a^2}, \quad c^2 = \frac{4a^2}{(l-m)^2 + 4a^2}, \quad d=1.$$

\therefore The elliptic function of the third order in Y disappears.

PROBLEMS.

42. Proposed by O. W. ANTHONY, M. Sc., Professor of Mathematics and Astronomy, New Windsor College, New Windsor, Maryland.

Find the time of vibration of a particle *slightly* displaced from the center of a solid cylinder in direction of the axis, the matter of the cylinder attracting according to the laws of nature.

43. Proposed by B. F. FINKEL, A. M., Professor of Mathematics and Physics, Drury College, Springfield, Missouri.

Two weights P and Q rest on the concave side of a parabola whose axis is horizontal, and are connected by a string, length l , which passes over a smooth peg at the focus, F . [*Bowser's Analytic Mechanics*, page 54.]

DIOPHANTINE ANALYSIS.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

SOLUTIONS OF PROBLEMS.

42. Proposed by W. B. ESCOTT, 6123 Ellis Avenue, Chicago, Illinois.

In a parallelogram, sides a and b , diagonals c and d , $2a^2 + 2b^2 = c^2 + d^2$. Find all the parallelograms, not rectangles, whose sides and diagonals are rational.

Examples:

a	b	c	d
4	7	9	7
16	7	21	13
8	9	13	11
8	11	17	9